

Application Serial No. 11/
Preliminary Amendment

PATENT
Attorney Docket No. WLI-001A

Amendments to the Specification

In the Specification

Please substitute the following paragraph for the paragraph at page 5, lines 17-20:

Still another object of this invention is provide a UV-laser based water treatment system and methods to irradiate water with monochromatic laser light, all or a predominant portion of which is at wavelengths within the ultraviolet range of about 180 nm to 400nm (55,560 cm⁻¹ to 25,000 cm⁻¹) and, in some preferred embodiments for selected applications, about 193 nm (51,810 cm⁻¹) or lower.

Please substitute the following paragraph for the paragraph at page 7, lines 1-7:

only a few minutes or less of exposure of a water sample containing the chemicals to UV laser radiation, preferably at one, or several, or within a range of monochromatic UV wavelengths of about 180 nm to 400nm (55,560 cm⁻¹ to 25,000 cm⁻¹), in some instances preferably about 193 nm (51,810 cm⁻¹) or lower. It has been consistently found that a UV laser treatment in accordance with this invention results in higher decomposition/ destruction of chemical constituents in a treated aqueous sample over a dramatically shorter period of treatment time than does light from other photonic sources, specifically light from a UV lamp.

Please substitute the following paragraph for the paragraph at page 7, lines 8-19:

In a preferred embodiment of this invention, the UV laser radiation wavelength(s) used is (are) selected in relation to the chemical substance(s) to be decomposed in a particular aqueous sample. It has been found that UV laser radiation wavelengths or wavelength ranges can be effectively coordinated with chemical atomic bonding energies. Thus, in accordance with an embodiment of this invention, it may be possible to identify a preferred UV laser radiation wavelength for decomposing a single chemical constituent, or to identify preferred multiple UV laser radiation wavelengths, or a preferred UV laser radiation wavelength range, for decomposing multiple chemical constituents or for addressing a single chemical constituent that may decompose into different intermediate substances prior to complete decomposition. In some instances, it has been found that UV laser radiation at about 193 nm (51,810 cm⁻¹) or lower, i.e., about 180 nm – 193 nm (55,560 cm⁻¹ to 51,810 cm⁻¹) is particularly effective in decomposing many of the chemical constituents of primary interest.

Please substitute the following paragraph for the paragraph at page 15, lines 8-24:

For example, in demonstrating the practice of one embodiment of this invention, a distilled water blank and various concentrations, ranging from about 5 ppm to about 500 ppm, of ammonium perfluorooctanoate (apfo) in distilled water were prepared. A portion of each apfo sample was set aside as a reference and another portion of each sample was introduced into a 22mm diameter by 50mm long synthetic quartz (Suprasil™) reaction vessel. The water solutions of apfo were irradiated by means of an excimer laser (LambdaPhysik LPX210i) producing a monochromatic 193 nm (51,810 cm⁻¹) wavelength beam operating at an energy level of 100 millijoules per pulse at a frequency of 50 pulses

per second. The laser beam was directed along (parallel to) the long axis of the reaction vessel and completely covered an 8mm high by 22 mm wide optical window section of the reaction vessel so as to fill an 8mm by 22mm portion of the reactor cavity with UV laser light resulting in the delivery of a UV light energy intensity of about 0.57 millijoules/square millimeter/pulse to the sample. A 30w deuterium lamp and Zeiss MMS-UV spectrometer were mounted perpendicular to the long axis of the reaction vessel and approximately in the middle of the reaction vessel to measure the ultraviolet spectrum of the contents of the reaction vessel as a function of time while the sample was being exposed to the UV laser light. Various parameters from the experimental system were interfaced to a computer system electrically